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Abstract

The Arizona Research Coordinating Unit (RCU) was established as an experimental program to fill the need for vocational research development, coordination, and dissemination. The RCU now provides: (1) research development including the identification of research needs, (2) research coordination and dissemination, (3) educational data collection, storage and retrieval, and (4) exemplary program development. The staff and the services are available to the State Department of Education, educational institutions, and vocational educators and researchers throughout the state. This report discusses the organization and current operation of the RCU and provides recommendations for continued improvement. Some recommendations are: (1) The RCU should remain a service organization, (2) Junior colleges, high schools, elementary schools, business and industry, the state department of vocational education, and the state employment service should be directly involved in the vocational research of the universities and in projects of their own, and (3) The Educational Resources Information Center (ERIC) should be adapted to direct-access search and retrieval, and the RCU should have its entire library in ERIC instead of maintaining a separate facility. Supporting data and RCU activities are appended. (DM)

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FINAL
~~ANNUAL~~ REPORT
Project No. ERD-6-3029
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CONTINUATION OF ARIZONA OCCUPATIONAL RESEARCH COORDINATING UNIT

Dr. Arthur M. Lee
Northern Arizona University
Flagstaff, Arizona

September 1969

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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U.S. DEPARTMENT OF
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SUMMARY

In the past four years the Arizona Research Coordinating Unit has worked with a large number of educators and researchers, educational institutions, state and federal agencies, employers and others in identifying research needs and developing programs and projects to meet those needs. The result is a systems approach to vocational-technical research now in operation consisting of identification, development, coordination, dissemination and data collection.

Research needs are identified through a sixty member council representing the high schools, community colleges, universities, State Department of Vocational Education, State Employment Service, labor, business and industry. Development is based on priorities established by the council, requirements of the State Department, and the interests of researchers. In the four year period sixty proposals and recommendations have been developed into active projects supported by Federal, State, local and foundation funds. Thirty-nine have been completed and twenty-one are currently in progress.

Coordination is provided through a network of communications within the state and with all other RCUs, the U.S. Office of Education, the national centers, regional laboratories, and ERIC. Dissemination is carried out from an RCU library of 2,226 shelved materials, 2,368 reports on microfiche, and 28,372 bibliographical references to materials available from other RCUs and vocational library collections. All titles are coded by educational level, occupational area and kind of publications. They are cross-indexed by subject under forty-seven headings, and each individual file is stored on magnetic tape for search and retrieval through high speed electronic computer equipment.

Data collection at the present time consists of enrollment and educational files on all vocational-technical students each semester and on former students followed up each year. These data are stored on magnetic tape and used to produce twenty-two computer printouts during the year requested by the State Department of Vocational Education for federal reporting, program evaluation, and the annual State Plan. Cost accounting, equipment inventory control and career counseling data are being added this year. Preliminary exploration is underway to add educational data from all high school, community college, and adult students; employment data; and additional economic data.

The Arizona RCU currently has a professional and clerical staff of eleven full-time and five part-time personnel organized in four divisions: research development, library and information services, data development, and exemplary program development.

INTRODUCTION

The Arizona Research Coordinating Unit was established by Northern Arizona University in 1965 in cooperation with the State Department of Vocational Education under a research grant from the U.S. Office of Education. RCUs, as they are called, are located in forty-seven states and Puerto Rico and are being added in the other three states. They are organized in State Departments of Vocational Education, universities, research foundations, or other agencies according to the preference of each state. Their functions are to develop and coordinate research in vocational and technical education in secondary schools, community colleges and universities, business and industry, and other public and private agencies.

Congress recognized the work of the RCUs by providing for their support in the Vocational Education Amendments of 1968. RCU funds now come from basic federal grants to the states for vocational-technical education, and each State Board may determine whether the RCU is located in the State Department, a university, or in another agency. Most states have continued their RCUs as they were organized under initial federal research grants and this is true of Arizona. The broad objectives are still the same, but with added emphasis on needs of State Departments of Vocational Education for research services.

In Arizona the RCU was organized to be responsive to the needs of the State Department by providing Department personnel with professional resources from the University and making these resources available to vocational educators and researchers throughout the state. This continues to be the fundamental purpose of the RCU as described in the 1969 Arizona State Plan. The following report is a summary of how that purpose has been carried out until now under direct federal research grants to the University. It is the Annual Report of the Arizona Research Coordinating Unit and also the Final Report to the U.S. Office of Education required under the grant ending August 31, 1969. For the convenience of those who have not read the two previous reports issued by the Arizona RCU in December, 1966, and July, 1968, brief summaries of those periods are included.

ORGANIZATION AND OPERATION

First Grant Period
June 15, 1965 - December 31, 1966

The RCU was organized by Northern Arizona University because of the mutual interest of the State Director of Vocational Education and the President of the University in its purpose. It was intended to "work directly with the Department of Vocational Education and . . . perform the functions of consultant in research as listed in the Arizona State Plan." These functions were specifically: "(a) to be responsible to the State Director for the direction, supervision, and coordination of research and vocational-technical education, (b) prepare statistical and progress reports as requested by the State Director, (c) to evaluate research proposals submitted by individuals and institutions related to vocational and technical education, (d) to recommend research projects for approval to the State Director of Vocational-Technical Education, (e) to explore opportunities for research to improve vocational-technical education, (f) to initiate and conduct research projects, (g) to cooperate with other agencies and individuals in conducting research, (h) to cooperate with supervisors, schools, colleges and other agencies in planning pilot programs, studies, experimental and demonstration schools and other research projects in vocational-technical education, (i) to prepare and disseminate reports on research studies, (j) to assist in the preparation of research projects and surveys, (k) to work closely with the State Employment Service and others in procuring occupational information."[1]

A staff of three professional and two clerical personnel was located in Phoenix in order to be near the State Department and most of the state's school population. During this eighteen month period an inventory of research resources in the schools and universities was attempted. Proposals for federal, state, and foundation grants were encouraged and proposal writing became one of the first regular activities in the new unit. A beginning was made in gathering research materials for dissemination, but reports of significant vocational research were quite limited and extremely difficult to locate at that time. ERIC was just getting started.

Three efforts at coordination were undertaken, two formally and one informally. A state-wide vocational research conference was

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[1]Arthur M. Lee, Establishment of a State Occupational Research and Development Coordinating Unit (Northern Arizona University, 1965), 2.

sponsored which was well attended and generated interest; but there was virtually no research to coordinate and very few prospects of any. The most important product of that conference other than the awareness it created of the RCU's existence was a list of 101 research needs and suggestions. The other formal effort at coordination was a regional conference of RCU personnel in the western states sponsored by the Arizona RCU and supported by a small grant from the U.S. Office of Education. It was the first of a series of annual conferences of this kind which have proved very helpful and which led to similar regional RCU organizations in the south, upper midwest and northeast. These are now supplemented by a national conference each year. Informal efforts at coordination were carried on through personal contacts, local and state meetings, and national meetings of various kinds. These led to a long range state plan for vocational research in 1966 developed through an ad hoc committee of educators and employers and sponsored by the RCU. It was published under the title, Research for Career Education.

Research development was intended to cover all areas of vocational-technical education, but initial success was realized only in the health occupations. Projects were designed and proposals written, approved, and carried out in identifying commonalities in health occupations curricula, in a health services education center development, in employment projections, and in job analysis. Several attempts were made to develop research in engineering technology and proposals were written but without success. Eventually Northern Arizona University sponsored an exploratory project in this area which was carried out by the RCU staff. Another small project was sponsored by the State Department of Vocational Education and the Phoenix Union High School District in vocational agriculture. The largest project designed and written as a proposal by the RCU was for ten high school districts and the Community College of Cochise County to establish a unified vocational education program available to all students in the County. It was approved and eventually begun under an ESEA Title III grant. This project is now in its second year.

Second Grant Period
January 1, 1967 - June 30, 1968

A reduction in funds after the first eighteen months of operation caused by the war in Viet Nam resulted in reorganization of the RCU staff and a major shift in emphasis. Since no new federal grants could be expected and other sources of support for vocational research were equally difficult to find, it was decided that the RCU would use the major part of its funds to carry out one or two large scale projects of its own. The first was a state-wide study of educational

needs in thirty-three engineering, technical, and skilled industrial occupations. This was carried out with the active participation of the three universities, six community colleges, State Employment Service, and employers of 98% of the engineers and technicians in the State.

The second project in this period was a study of the total vocational-technical education effort in Arizona, public and private. It has encountered considerable delay and is now scheduled for publication early in 1970. Research materials from ERIC and other sources were gradually built up and a library established. Dissemination activities were carried on through a newsletter, requests for assistance, and local and state conferences. Coordination was a growing problem with hand methods of library search and retrieval, but ERIC was coming along and the Ohio State Center began publishing more complete collections of abstracts in AIM and ARM. Efforts to achieve better national coordination were pursued through a national RCU Conference, discussions with the U.S. Office of Education, and organization of the American Vocational Education Research Association as an affiliate of AVA.

Additional research development was largely dormant in Arizona during this period, but some efforts were carried on. Assistance was provided to several institutions in designing projects and writing proposal outlines including Maricopa Technical College, Cochise County, Arizona Western College, and the three universities. A systematic identification of vocational research needs and priorities was begun with the organization of a State Vocational Research Council. Some assistance was given to the State Department of Vocational Education in designing a student enrollment data system. And an informational publication was prepared for the State Development Board listing vocational-technical programs in all the schools.

Grant Extension Period
July 1, 1968 - August 31, 1969

During the second grant period the USOE Bureau of Research reached two important decisions affecting RCUs: they were to be continued indefinitely under five year contracts; and they would be given some funds for state and local projects. The five year contracts were negotiated one year at a time and the Arizona RCU began its first year under this program in July 1968. Twenty thousand dollars was included in the first year's contract for state and local research which was designated by the USOE Bureau of Research as a discretionary award fund. From that fund in Arizona direct assistance has been provided for thirty-one projects in nineteen institutions. These are listed in Appendix A, page 34.

Two other major activities were initiated by the Arizona RCU during this period. At the request of the State Department of Vocational Education automatic enrollment and followup data processing of all vocational-technical students in the state was begun. This involved enrollment input data on approximately 137,000 students and followup data on 7,000 students in the first year. The second major undertaking was to automate the RCU library for more efficient service to educators and researchers. A new cataloging, cross-indexing and coding system was designed and the entire collection of shelved materials, microfiche, and bibliography was reexamined one item at a time, coded, and about half of it keypunched and stored in the computer. Coding and keypunching are continuing as rapidly as possible until the entire collection is available for automatic search and retrieval. In the meantime over 200 requests for research materials have been processed by hand in the past year using the new coding system.

Three other dissemination activities during the past year have included state research conferences, research reviews, and the RCU newsletter. The first research conference was conducted for the State Department of Vocational Education professional staff and county coordinators. It was a two and one-half day concentrated program in research resources, research utilization, data collection and processing, students with special needs, and vocational teacher education research. A similar two day conference was held for State Department supervisors and teacher educators from the three universities.

Professional reviews of significant research reports were initiated to help fill the need for a guide to significant research results in the increasing volume of reports available. Under this program any report coming into the library either in hard copy or microfiche which appears to merit serious review is given to a specialist in that field in one of the Arizona institutions. For a small stipend from the discretionary award fund,that person prepares a carefully structured report of the document including recommendations for distribution. These reviews become the basis for further dissemination and are also condensed in the RCU Newsletter. The Newsletter itself is used to call attention to these and other items which vocational educators may wish to use in modifying their programs or developing new programs.

Under a contract with the State Division of Adult Basic Education the RCU this year has also designed and operated a complete computerized record system including student and faculty enrollment data, student achievement data, financial data, and student followup data. The system was operated for one year as a pilot program and then turned over to the Division with recommendations for continued operation and improvements.

Assistance was also provided to the State Department of Vocational Education in preparing the first State Plan for Vocational-Technical Education under the Amendments of 1968. Using the data previously collected for enrollment and followup reporting and adding to these additional data as needed, the RCU prepared subsections 1.0, 2.0,3.0,5.0,6.0 in Section II; and Tables 1,2,3, and 4 in Section III.

Continuation Under State Plan

Research provisions in the Arizona State Plan for Vocational Education were drafted by the RCU, thoroughly reviewed by the State Department of Vocational Education, and approved by the State Advisory Council and the U.S. Office of Education. They follow logically the state research program developed by the RCU during the past four years and provide a smooth transition from federal grants to state support. The RCU Director is delegated responsibility as Consultant in Research on the State Department Staff with the same duties as were written into the first RCU proposal (see page 3). Section I-5 of the State Plan describes the full program as follows:

5.0 Vocational Education Research and Personnel Training.

In addition to the provisions in 1.0 and 2.0 of this part of the State Plan, the following special provisions apply to research and training supported with federal funds under Part C of the Act:

5.1 State Research Coordination Unit.

The Arizona Research Coordinating Unit has been in operation by Northern Arizona University since June 15, 1965, under a federal grant from vocational research funds and state support through the Department of Vocational Education. It will continue to be operated by Northern Arizona University under the State Plan through federal funds provided for this purpose in Section 131(b) of the Act and state funds through the Department of Vocational Education. A written agreement to this effect is contained in the Appendix to the State Plan.

5.11 Location.

The Research Coordinating Unit (RCU) will continue to be located geographically in Phoenix with the State Department of Vocational Education and will

work with the State Department staff in carrying out the activities assigned in the State Plan. The RCU will also work directly with educators and administrators at each of the three state universities, the community colleges, high schools, elementary schools, private schools, and with employers and other state agencies in carrying out its activities.

5.12 Administration and Supervision.

The RCU will continue to be administered by a Director responsible to the Provost of the University who is responsible to the President. The University operates under the authority of the State Board of Regents, which has responsibility for the three state universities.

The RCU Director works with the State Department of Vocational Education in determining research activities and priorities. The State Director may request the President of the University to direct the RCU to carry out specified research activities which are of major concern to the State Department.

5.13 Major Functions of the RCU.

It is the responsibility of the RCU under the State Plan to:

1. Stimulate and encourage occupational education research and development activities in state departments, local school districts, colleges and universities, and non-profit organizations.

2. Coordinate occupational research activities conducted within the State and with those being conducted outside the State.

3. Disseminate information on the progress and applications of the results of occupational education research.

4. Stimulate activities which will result in increased interest and improved competence in research.

5. Participate in the development, monitoring or conducting, as appropriate, of occupational research and development projects supported by federal, state, local, or private organization funds.

6. Cooperate with the State Department of Economic Planning and Development in identifying and maintaining an inventory of available occupational research and development resources in light of anticipated needs and programs within the State.

7. Cooperate with the State Employment Service in surveying available data on employment opportunities, emerging occupational trends, and future job projections as a base for planning vocational programs within the State.

8. Identify issues and problems relating to the nature and place of Vocational Education in the State school system, and determine the contributions which occupational research and development could make in resolving them.

9. Perform the services of research consultant for the State Department of Vocational Education.

10. Gather, process, and disseminate data required by the State Department for program planning, management, evaluation, reporting, and research.

11. Assist the State Department, local schools and individuals in designing and developing exemplary programs in Vocational Education meeting the requirements of Part D of the Act and provided for in Section 6.0 -6.24 (Section I) of the State Plan.

5.14 Professional Staff.

The activities involved in performing the functions listed in Section 5.13 are divided into four major categories: research development; data development; exemplary program development; and dissemination. The RCU has four divisions corresponding to these major groups of activities.

5.14-1 Director.

Final responsibility for all activities rests with the Director. His major activities are management of the total program, identifying and developing research, and coordinating vocational research within the State and with institutions and agencies outside the State. Qualifications are a doctorate in education, a vocational field, or one of the social sciences; and five years or equivalent full-time experience in educational administration, teaching, and research including some experience in each.

5.14-2 Division of Research Development. Head of Division.

This staff position includes major responsibility for grants and stipends; research design and consulting services; RCU in-house research; and research followup. It includes assisting responsibilities for manpower and employment data development, exemplary program design, and dissemination. Qualifications include a masters or equivalent degree in education, a vocational field, or one of the social sciences with graduate work in research, statistics, and data processing; and three years or equivalent full-time experience in research.

5.14-3 Research Assistant.

This is a staff position with major responsibility for designated projects and assisting responsibility for all activities in the Division. Qualifications include a baccalaureate degree and experience in teaching, research, counselling, data processing, or professional writing.

5.14-4 Division of Data Development. Head of Division.

Major responsibilities are data systems design, quality control, input and output of enrollment and followup data in Vocational and Adult Basic Education, manpower and employment data, equipment and facilities data, cost accounting and cost-effectiveness data, and evaluation data. Qualifications include a masters degree or equivalent in education, a vocational field or one of the social sciences; graduate work in research, statistics and data processing; and three years or equivalent full-

time experience in data processing and statistical, educational, economic, or other research in the social sciences.

5.14-5 Computer Programmer.

A staff position with major responsibility for writing computer programs for all data systems and research projects; and supervising input, processing and output of these systems and projects. Qualifications include appropriate educational experiences in data processing, and two years or full-time equivalent work experience in data processing.

5.14-6 Division of Library and Information Services. Head of Division.

Major responsibility for collecting, organizing, and processing research data and materials; dissemination of research data and materials; and publishing RCU documents and materials. Assisting responsibility for research design and development, systems design, and quality control. Qualifications include a baccalaureate degree and graduate or specialized courses in library science, research, and data processing; and three years or full-time equivalent experience in library work, research, teaching, data processing, or professional writing including some experience in at least three of these aress.

5.14-7 Librarian.

This is a semi-professional position, eventually to become fully professional, with major responsibility for acquisitions cataloguing, search and retrieval, and distribution of materials in the RCU library. The Librarian has assisting responsibility for RCU publications and in-house research. Qualifications include college-level preparation in library science, office skills, and vocational education or equivalent full-time work experience.

5.14-8 Division of Exemplary Program Development. Head of Division.

Major responsibilities are to assist vocational educators in designing exemplary programs, writing proposals, advising and consulting in the planning

of exemplary programs by local school districts and the State Department of Vocational Education, monitoring programs underway, solving problems that occur in exemplary programs, and assuring dissemination of knowledge gained through exemplary programs. Qualifications include a masters degree or equivalent in a vocational or related field and three years or full-time equivalent experience in Vocational Education. This position is filled through recommendation by the State Director of Vocational Education.

5.15 State Vocational Research Council.

A group of educators, employers and administrators representing the universities, community colleges, high schools, labor, minority and community action groups, major industries and business companies, the State Employment Service, and the State Department of Vocational Education has been established to identify research needs in the State and determine their relative importance to Vocational Education. The Council meets at least once each quarter, with staff support between meetings provided by the RCU. Its recommendations are used by the RCU in developing research projects and activities, and the RCU is guided by the Council in making recommendations to the State Board for grants from funds allocated under Section 131(b), Part C, of PL 90-576.

Coordination of research actions by the RCU with other research activities in the State affecting Vocational Education is accomplished through the Vocational Research Council and its individual members. The Coordinator of Research at each of the three state universities is a member of the Council; the Director of Research in the State Employment Service is a member and as additional agencies or organizations become active in research areas affecting Vocational Education their chief executive officers are invited to membership on the State Vocational Research Council.

5.2 Application Procedures.

Educators and researchers may receive financial support from the State Board in carrying out research of special benefit to Vocational Education in the schools. The RCU staff, State Department personnel, and the State Vocational Research Council review

proposals and make recommendations based on a need for the research, the quality of the design, qualifications of the applicant, cost, and other factors.

5.21 Submittal of Applications.

Applications for research grants may be submitted by any public or private educational institution or organization within the state, from a private business or industry or from a state or local government agency. Each application must contain the following:

1. A brief description of the specific problem in Vocational or Technical Education with which the research is concerned.

2. A statement of the objectives of this particular project.

3. A list of procedures in chronological order through which the objectives are to be achieved.

4. Education and experience qualifications of the principal investigator and other professional staff.

5. Estimated cost of the project divided into major categories such as personnel, supplies, and equipment, clerical, travel, etc.

6. Identification of the facilities to be used.

7. Additional support to be contributed to the project from other sources.

8. A brief description of the findings of previous or related research, and uses to be made of those findings in the research now being proposed.

9. A statement by the applicant of the need for this research by vocational-technical educators, and what use will be made of the additional data gained.

10. Preliminary investigations or previous research in the proposed subject by the applicant, and persons with whom he has discussed this proposal with their comments.

11. Relevance of the proposed research to annual and long-range State Plans for Vocational-Technical Education.

12. Duration of the project proposed.

13. Additional information if necessary following conferences with RCU and State Department personnel.

Applications will be submitted to the RCU signed by the principal investigator or initiator and an authorized representative of the sponsoring institution or organization. Applications will be acknowledged in writing and acted upon within thirty days following the next scheduled meeting of the State Vocational Research Council after being received by the RCU.

5.22 Review of Applications.

The Vocational Research Council will act as a review committee for all vocational research grant applications. Additional in-house review will be provided by professional staff in the State Department of Vocational Education and the RCU. When grant applications are received and acknowledged, these procedures will be followed:

5.22-1 Initial Review.

The RCU will determine in each case the relationship of the proposed research to similar projects in other institutions or other states and if the application contains required information, soundness of design, reasonableness of cost estimates, and a statement of expected benefits to Vocational Education. Assistance may be provided by the RCU to correct deficiencies and strengthen the application. In-house review may be requested from State Department personnel or individual members of the Vocational Research Council.

5.22-2 Formal Review.

A copy of each application containing all required information will be sent to each member of the Vocational Research Council. Applications ordinarily will be discussed at the next quarterly meeting of the Council, or,

in cases of urgency, the RCU may request individual opinions by mail. The Council will review each application according to the following criteria: relevance to annual and long range State Plans; adequacy of facilities; reasonableness of cost estimates; expected outcomes; expected use of findings; and priority in relation to other research.

5.23 Acting on Applications.

The Director of the RCU will give written recommendations for approval of applications to the State Board for Vocational Education and, at the same time, notify applicants of the action taken. If an application is not recommended for approval, a letter to this effect will be sent to the applicant with suggestions for improvement or further discussions leading either to a recommendation for approval or disapproval. If an application is recommended for approval, and funds in the current fiscal year are insufficient to award a grant, the recommendation may state whether the application must be resubmitted for funding at a later date or will be funded later without additional action required. Copies of the application together with the recommendation of the RCU will be sent to the Division of Vocational Education and to the Division of Comprehensive and Vocational Research in the U.S. Office of Education.

The State Board of Vocational Education, through the State Director, will determine if applications recommended by the RCU meet requirements in the federal regulations and the State Plan and if sufficient funds are available for each grant recommended. If these conditions are met, the State Director will notify the sponsoring institution of the award, with copies of the notification to the principal investigator and the RCU.

Within fifteen days of notification of approval, a grant document will be negotiated by the State Department and the sponsoring institution containing budget amounts, method and schedule of payment, reporting requirements, and special conditions recommended either by the RCU or the State Department.

5.3 Notification to Commissioner.

Within fifteen days after receiving notification of approval by the State Board, the RCU Director will send copies of each proposal, including the amount and period of the grant, to the Commissioner.[2]

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[2]Arizona State Plan for Vocational-Technical Education (1969), Section 1.35 - 7; 5.0 - 5.3.

RESULTS

The total results of the RCU grants described in this report include not only research generated and disseminated but the system itself. The principal task has been to establish relationships, to explore approaches, and to develop procedures which will make research services available to vocational educators throughout the state. That is described in the preceding section under Organization and Operations, and its accomplishment is the most important result of the establishment of the Arizona Research Coordinating Unit. Additional details about the actual research, dissemination, and data collection carried out under the grant ending August 31, 1969 are described below.

Research Development

Thirty-one research and related projects have been completed since the beginning of the second RCU grant in January, 1967. They are listed here by project number. The letters in each case identify the sponsoring institution, followed by year and serial number assigned when the project began. Those which were reviewed as proposals by the Arizona Vocational Research Council are identified by date of review and Council rating. The Council rating scale is 1 to 5 in descending priority.

RCU-67-1. Education and Employment Requirements of Engineering Technology in Arizona. A major study of thirty-six occupations ranging from engineering to skilled industrial craftsment based on two surveys, one of employees and employers and one of educational institutions. Ninety-five percent of the employers of engineering related personnel employing ninety-eight percent of the engineers and technicians in Arizona participated. Questionnaires were distributed to all employers in the thirty-six occupations. Data from 580 employers and 3,926 employees were tabulated and analyzed together with data from the universities, community colleges, secondary schools, and State Employment Service. A 274 page report was published and distributed throughout the state and to educational institutions and employer groups in all fifty states and several foreign countries. It contained eight major recommendations, all of which have been or are being put into effect in Arizona at the present time.

ASU-67-3. The Use of Advisory Committees in Vocational Education, a graduate study at ASU. Report contained nothing significant, not distributed.

NAU-68-5. A Survey of Industrial Education and Technology at Northern Arizona University. Council review 9-27-68. Rating 3.12. Report contains "A Critical Analysis of the Major Functional Areas of the Industrial and Technical Education Programs in the School of Applied Science and Technology." Areas included were courses, instruction, and student services based on a survey of all graduates in the past five years. Report contains recommendations for strengthening weaknesses, elimination and replacement of some courses, implementation of an instructor evaluation system at the department level, the addition of courses suggested by former students, and more emphasis on vocational guidance and counseling particularly by individual instructors. Recommendations currently being carried out by the University.

NAU-68-10. An Employment and Training Survey of Women in Flagstaff. Council review 9-27-68. Rating 4.53. A graduate study at NAU to determine occupational characteristics of the female population of the city. Due to faulty techniques by the students in collecting data the results are of interest but doubtful significance. Among the results are these: 50% are employed, 70% feel no restrictions because of sex, 84% feel no restrictions because of age, 90% are married with an average of 2.7 children each, 22% are continuing their education, 60% feel they need additional training, 56% work to supplement family income, 40% work primarily for personal satisfaction.

NAU-68-16. A survey of the Education and Employment Opportunities for Commercial Art Students. Council review 9-27-68. Rating 4.25. A survey based on questionnaires completed by 246 educational institutions and ninety-one advertising agencies and free lance studios in the United States. The results indicated strongly that salaries are usually low in this field, educational programs are generally poor, and schools and employers traditionally have had little contact with each other. The NAU commercial art program is being completely revised as a result of this study to include an internship program, better counseling, and changes in the curriculum.

NAU-68-20. Survey of Prevocational Education in the Elementary Grades. Council review 9-27-68. Rating 2.25. When the Council reviewed this proposal six educators gave it a number 1 rating and one of them wrote "most urgent." An examination of current literature and programs involving occupational and skill training in elementary school prevocational education. Carried out as the first step in designing a completely integrated experimental program of general education and occupational education in grades 1-8. This project has since been merged with NAU-68-17.

ASU-68-24. Development of a Group Guidance Manual in Vocational Counseling. Council review 9-27-68. Rating 2.43. Manual developed, published, and distributed by ASU.

ASU-68-28. A Pilot Program in Industrial Internship for Technical Teachers. Results are being applied in full implementation.

UA-68-28. Development and Evaluation of an Instructional Unit for Teaching the Principles of the Internal Combustion Engine. A set of ten instructional units have been developed and incorporated into a 112-page teaching manual and a 90-page student workbook. The instructional units were pilot tested in eight departments of vocational agriculture involving approximately 120 high school students with pre-tests and post-tests administered to all students.

RCU-68-33. A Conference on Research utilization for the State Department of Vocational Education September 4-6, 1968. Half-day sessions were held on: general session on vocational research; research symposium: students with special needs; application of enrollment data; enrollment data as a management tool; and vocational teacher education research. Percentages of conference participants who said they felt the sessions benefitted them in their work ranged from 83% on vocational teacher education research to 91% on the application of enrollment data. Ninety-six percent claimed an increase in their knowledge of research availability. Additional conferences to include other vocational educators were recommended.

RCU-68-34. Conference on Research Utilization for Teacher Educators, November 7-8, 1968. Four half-day sessions, a dinner session, and an evening session were held on: an overview of the new vocational education legislation; research utilization; the vocational education amendments of 1968; reports of conferences and workshops; special needs certification; and vocational teacher education research. The most valuable experience reported by the conferees was the exchange of ideas and compiling a list of recommendations for teacher education in the following year. Ninety-three percent said their knowledge of research availability had increased through the conference and eighty percent felt that utilization of research in the schools would be increased. Beneficial results from the sessions on involvement and followup data were reported by all participants.

PUHS-68-35. A Study of Students Who Register in Phoenix Union High Schools in the Spring But Do Not Show Up in the Fall for Classes. Questionnaires were sent to approximately 3,000 students who failed to report for classes in the fall of 1968 to determine their present status, why they had dropped out if no longer attending school, occupational information, and need for additional counseling. Data have been collected, tabulated and analyzed, for administrative policy and program planning.

FCRC-68-42. A Study of Vocational-Technical Education in the Four Corners Regional Economic Development Area of Arizona, New Mexico, Colorado, and Utah. The Arizona RCU participated in the overall study and wrote the Arizona portion in cooperation with the Sterling Research Institute.

ASU-68-42. The Effects of Counselor-Supervisors' Verbal Reinforcements Upon Counselor Trainees' Verbal Behavior. Council review 1-9-69. Rating 3.07. A doctoral dissertation at ASU. Faculty supervisor stated: "The implications of her research have significant meaning in the preparation and training of counselors, para-professional or professional."

NAU-68-48. Industrial Internship in the Vocational T & I Teacher Education Program. This project was designed and carried out by the University Department Chairman without additional assistance. Information and experience available from other institutions were compiled and reports of research and experimental programs collected. The direct result was adoption by the University of a supervised work experience program in industry and in specialized industrial schools or workshops for which credit is given toward undergraduate and graduate degrees and for certification.

RCU-68-49. An Employer Evaluation of Vocational Technical Graduates. Questionnaires were distributed to a stratified sample of 1,421 employers in Arizona and 554 or 39% responses have been received. Of the responses, approximately 15% were from employers who have employed vocational-technical graduates. The results have been used in program planning by the State Department of Vocational Education.

UA-68-51. Development of a Program of Instruction for Agricultural Machinery Operation and Irrigation for Youth with Special Needs at High School Level. A graduate student project carried out in the Department of Agricultural Education at the U of A which the Department felt would be highly beneficial in serving youth with special needs.

UA-68-52. Vocational Competencies Needed by Fieldmen in Selected Agricultural Supply Businesses. A graduate study in the Department of Agricultural Education at the University of Arizona. An occupational analysis of employees in agricultural supply businesses handling mainly either feeds or agricultural chemical-fertilizers. Common skills and kinds of knowledge were identified and analyzed. A training program for agricultural supply business fieldman was designed on the basis of the findings in this study. Abstract and full report are available.

RCU-68-54. Development and Operation of a Data Processing System for Adult Basic Education in Arizona. A complete record system with monthly input on student enrollment, progress, curricula, instructional staff, teacher evaluations, costs, and followup of students graduating or leaving the program. Monthly printouts of eighteen tables of data provide a variety of checks and analyses of program operation. This project involved designing and putting into operation a completely new record keeping system; new procedures, and an

extensive evaluation of the Adult Basic Education program. A progress report was prepared and distributed after six months and a Final Report has just been published.

RCU-68-55. Industrial Arts and Home Economics Useful Enrollment Data System. This supplements the regular vocational education enrollment data system with class data only for these groups. Complete returns are in for the 1968-69 school year, and a tabular printout has been run. The results are being used by the State Department of Vocational Education, and will be incorporated in "Learning a Living" to be published in January, 1970.

RCU-68-59. Vocational Education Enrollment and Data Processing for the School Year 1968-69. Enrollment data collected from approximately 22,000 students, tabulated, analyzed and used in reports and future planning.

RCU-68-60. Followup of 1968-69 Vocational Education Graduates and Transfers or Dropouts. A survey of approximately 7,000 former vocational education students gathering data on job placement, continuing education, and other activities since leaving school.

RCU-68-62. Research Reviews. Twenty-four research reports, most of them of national significance, were reviewed by selected experts in their fields in Arizona. The results have been distributed in research conferences, through the RCU Newsletter, and on direct request.

RCU-68-63. Publication of the Arizona RCU Bulletin. Issues of the Bulletin were published to a mailing list of 4,500 containing information about research in progress, research reports, and other vocational research activities in Arizona and other states.

ASU-68-64. The Development of Communication Skills in Vocational Guidance and Counseling. A doctoral dissertation at ASU in the Department of Counseling and Educational Psychology.

UA-69-1. Conference on Meeting Tucson's Health Science Manpower Needs. A background paper was prepared by the Division of Economic and Business Research at the University of Arizona as resource material for the Conference. Hard data were also prepared for the use of the workshop discussion groups dealing with specific occupational categories. Background paper and report of the Conference available.

NAU-69-5. Projections for Correctional Programs in Education. A study of the occupational training and experience of the inmates, and current programs in vocational education, in the Arizona State Prison and the Arizona State Industrial School at Fort Grant. The

results show a definite need for general education upgrading of the inmates particularly in vocational education. Participation in current programs is extremely low due to inadequate facilities, inmate indifference to some betterment, neglect of vocational and educational guidance services, inadequate library and resource facilities, and opportunities to earn wages in other activities which would be forefeited while attending educational programs. A list of eleven specific recommendations were made to the State Department of Corrections for revising and improving the educational programs as a part of this report. Copies of the report have been distributed throughout Arizona and other states.

RCU-69-7. Adult Vocational Education Enrollment. Enrollment data by class collected for all adult vocational education students in the past year, stored, tabulated, and analyzed. Printout delivered to State Department of Vocational Education and available at the RCU.

FWHS-69-8. A Planning Program for the Comprehensive High School. A joint committee of faculty from Flowing Wells and Sahuarita High Schools near Tucson met in a series of meetings during the past year to plan in considerable detail a high school curriculum to better help students discover their interests and abilities and how they relate to career opportunities, and to encourage apathetic students to accept their responsibilities in the learning activities of the school by providing a climate for them to see the relevancy of the academic subject matter to vocational requirements. A report has been prepared and is available at the RCU which discusses the problem of students not destined for college graduation but required to take college preparatory programs in high school; the objectives of the new curriculum; procedures; detail on implementation; and additional funds required.

GLCC-69-10. Evaluation of a Language Skills Program at Glendale Community College. Data were collected from the academic records, faculty, and students in a special course to upgrade communications skills. The data confirmed and documented previous faculty observations of the results of this course. A presentation was made containing these evaluation data at a meeting of the American Guidance and Counseling Association in Las Vegas.

SDPI-69-14. A Study of Critical Education Needs in Arizona for the 1970 ESEA Title III State Plan. This project was carried out by the State Department of Public Instruction covering three areas of information: the programs, services and activities currently in existence in Arizona schools; and critical education needs as perceived by educators (public and private), representatives of colleges and universities, and the lay public. Final report received and available.

The following are research activities in progress:

ASU-68-7. Responsibility for Technical Curricula in Arizona Junior Colleges. A doctoral dissertation at ASU which seeks to identify the principle decision making processes in adopting new curricula and changing or discontinuing existing curricula in technical education. The data have been collected and are in the process of tabulation and analysis. Final dissertation in preparation.

ASU-68-13. Televised Course in Career Counseling. Council review 9-27-68. Rating 2.0. A series of occupational films for either educational or commercial TV showing typical scenes in a day's work for students and parents as well as teacher and guidance personnel. Continuity script and course materials would be prepared and university credit given to teachers and counselors. Project being designed and proposal written with assistance from RCU.

RCU-68-14. A Computerized Vocational Guidance Program. Council review 9-27-68. Rating 3.27. This project has been merged with RCU-68-44 (see below).

NAU-68-14. A Seventeen-Year Pre-Vocational Education Experimental Program. Council review 9-27-68. Rating 2.60. A steering committee of ten members from the NAU College of Education, School of Applied Science and Technology, State Department of Vocational Education, and the RCU has been organized. Preliminary data grathering is underway with a one or two-year planning schedule being developed. First year support by the RCU will include preparation of a large scale grant application to the U.S. Office of Education for the following and subsequent years.

UA-68-19. Measuring Communication Needs of Engineering Technology Students. Council review 9-27-68. Rating 2.93. Dr. George Howard at the U of A submitted a proposal for the Department of Educational Psychology, conferences were held with George and the Head of the Department, and an RCU grant to employ a graduate student for the 1969-70 school year was authorized.

ACESA-68-22. Arizona Conference on Engineering and Technology. Council review 9-27-68. Rating 2.81. The Arizona Council of Engineering and Scientific Associations has assumed sponsorship of this project and appointed a planning committee. The planning committee organized a steering committee which met May 23, 1969 and is scheduled to meet again in the fall. The Conference, intended as an annual event, will be held sometime in the winter or early spring of 1970.

ASU-68-27. Development of an In-Service Education Program for New Part-time and Full-time Technical Teachers. Council review 9-27-68. Rating 2.57. ASU has developed a course outline which is in the process of review and development of course materials. Funds have been allocated by the RCU for a graduate assistant in 1969-70 to help complete this project.

MTC-68-36. Development of a Community Career Planning Center. Council review 1-9-69. Rating 1.35. A proposal for a pilot project has been developed to test the need for an area vocational counseling center to serve all citizens of the community. Major services would include vocational guidance planning, assessment of applicants' interests and abilities, information on job requirements and local industrial business labor needs and trends, educational planning services for individuals needing initial training or retraining, financial assistance information, and referral to other agencies.

RCU-68-44. Development of a Complete State Wide Data Processing System for Vocational Technical Education. Council review 1-9-69. Rating 1.28. As currently planned this project consists of the integration of five data collection, storage and retrieval systems: student enrollment, followup, cost accounting, equipment inventory, and a student data bank. A sixth system to be added and nearly completed is a vocational teacher data bank. Eventually curriculum and individualized progression and achievement data may be added. This program has the greatest emphasis of all RCU activities in the immediate future and has a major share of the budget for 1969-70.

UA-68-50. A Study of Data Requirements for Vocational Technical Education Cost Accounting and Cost Effectiveness Research in Arizona. Council review 1-9-69. Rating 4.00. In spite of the low rating by the Council, due largely to the vagueness with which it was presented, this project is going ahead. Present efforts are beng directed toward identifying existing financial data, the condition of these data and their availability, and their suitability for cost accounting and cost effectiveness analysis. This work is being carried out by Dr. Steve Barsby in the Economics Department at the U of A. A complete cost accounting data system will be designed and this will be merged with RCU-68-44.

RCU-68-57. A Survey of Library Resources in Vocational Research in Arizona. This is being carried out by the RCU. Data have been gathered from the university and junior college libraries and most of the high school libraries in the State. A report will be prepared and distributed when the data are reasonably complete and have been analyzed.

RCU-68-58. An Updating of Selected Data in "Engineering and Technology in Arizona." A survey of employers of engineers and technicians has been completed. The responses are being keypunched for tabulation and analysis, and a 1969 supplement to last year's publication will be published in the fall.

RCU-69-3. Arizona Vocational Technical Teacher Data Bank. A survey has been made and a second more elaborate data collection system is now being designed. The results will probably be ready for inclusion in "Learning a Living."

SDVE-69-9. A Survey of Educational Requirements and Occupational Tasks in Nursing in Arizona. A detailed survey instrument has been designed and the project is currently waiting for funds to be carried out.

ASU-69-12. An Analysis of the Tasks Performed by Office Employees Compared with Subject Matter in High School Office Education Curricula. This is a doctoral dissertation at Northern Illinois University using Arizona data by a member of the faculty at ASU. A very detailed and extensive job analysis survey instrument has been designed and distributed to a stratified sample of students and employees in Arizona. The results are being keypunched, tabulated and analyzed in preparation for the final report.

RCU-69-13. Development of an Educational and Economic Data System in the Four Corners Regional Area. A rough draft proposal has been written and was discussed by the Council at its April 25, 1969 meeting. A finshed proposal for a feasibility study has been partly written as a result of the Council's discussions and this is expected to be completed and submitted to the U.S. Office of Education or the Four Corners Regional Commission in the near future.

NAU-69-18. Development of a comprehensive Vocational Education Teacher Education Program. Preliminary design work has been completed and a proposal prepared for further development under additional grant funds.

RCU-69-33. Development of Skill Centers in the Arizona Counties of the Four Corners Regional Area. Proposal written and submitted to Four Corners Regional Commission. Approval to begin immediately. Recruitment of personnel under way.

RCU-69-16. The 1969 State Plan for Vocational Technical Education in Arizona. A comprehensive document required under the Vocational Education Amendments of 1968 containing considerable statistical and other data assembled in a team effort by the State Department of Vocational Education submitted to the U.S. Office of Education after a public hearing and approval by the Arizona State Advisory Council.

RCU-69-27. Evaluation of MDTA Programs in the Past Year in Arizona. Under contract with State MDTA, evaluation instruments previously designed were field tested and modified instruments then used in carrying out evaluation. Report published and available.

RCU-67-2. "Learning A Living." A descriptive and statistical report of all vocational technical education in Arizona. This project has been underway for more than two years and represents several thousand man hours of research. Publication date has been moved forward several times due to other demands but is now scheduled for January 15, 1970.

CC-68-1. A Unified Vocational Education Program for the Ten High School Districts and the Community College in Cochise County. Council review 9-27-68. Rating 1.53. A one-year planning program under an ESEA Title III grant has been completed. The first year implementation stage is being carried out under a second Title III grant. Participating in this project are a group of local consultants from the high schools and community colleges, an advisory committee of school superintendents, a research team from NAU, and consultants from several state agencies and other institutions. When completed the project is intended to offer a completely modern vocational education program to all high school and post-high school students in the County.

FCRC-68-4. A Interstate Conference on Trade and Industrial Teacher Education. Council review 9-27-68. Rating 1.47. An attempt to coordinate workshops in several universities in the southwest to bring trade and industrial educators up to date in their technical fields. Proposal for support submitted to the Four Corners Regional Commission, and tentatively scheduled for the first week in March, 1970.

Coordination and Dissemination

These functions are centered in the RCU library, and results are based on the accumulation of materials and easy access to those materials by specific request. In order to achieve maximum utilization the Arizona RCU has undertaken to develop all of the resources in its library needed by any vocational educator or researcher from any institution in the country and to make these readily available through computer search and retrieval. The overall result of this effort is the following system.

A basic library was first collected which included the ERIC series of RESEARCH IN EDUCATION, AIM and ARM and the corresponding microfiche, ERIC'S THESARUS OF DESCRIPTORS, PACESETTERS IN INNOVATIONS, and MANPOWER RESEARCH; the Ohio State Center's bibliographical series; the University of Wisconsin Center's bibliographical lists; research reference works; occupational references; Arizona publications; U.S. Government publications; other RCU publications; university, private and public publications relating to vocational education and manpower; career information; dissertations and theses; regional and national projects and abstracts from the U.S. Office of Education; directories; economic data; and miscellaneous data and periodicals on vocational education. As each item is received by the library it is briefly reviewed by the Library Department Head. Selected research reports thought to be of special value and importance are sent to leading Arizona authorities for detailed reviewing and abstracting.

All incoming materials are assigned catalogue numbers and library cards are typed showing the number, title, author, publisher, date of publication, and the ED and VT number if the material is on microfiche. A coding card is also prepared for each item showing educational level, occupational area, subject matter under forty-seven indexes, classification and if reviewed whether the review was favorable or unfavorable. See Appendix B. The library and coding cards are sent to an RCU teletype operator who punches the information on paper tape for computer input. A flow chart of these procedures is shown in Appendix C. Once or twice a week depending on the quantity of material received the punched paper tapes are read into the computer through the RCU remote unit and stored permanently on magnetic tape. The input procedures from the RCU remote unit are shown in the flow chart in Appendix D.

Search and retrieval are virtually instantaneous. When a request is received for information the librarian completes a simple "Request for Information" form showing the name and address

of the individual making the request and briefly stating the contents of the request. The department head codes the request on the bottom of the form and submits it to the keypunch operator. The operator punches the request on paper tape, verifies it and reads it into the computer. The computer is programmed to reply with a complete biographical printout of all related materials in the RCU library, or available to the RCU from other libraries. The printout is issued in duplicate, one copy to the requester and the second copy filed for future reference in the RCU library. The requester may use the printout as an order form by checking the items he would like to see and returning it to the RCU. Upon receipt of the marked printout or a letter requesting specific items from the library the librarian fills out a "Request for Publications" form, and the materials are collected from the shelves and files. Library cards for the items are pulled and each card is flagged to indicate it is checked out, with the date, name and address of the requester entered on the back. Flow charts of these procedures are shown in Appendices E and F.

Data Collection

Twenty-two computer printouts of vocational education data have been produced during the past year by the RCU for program planning and evaluation and for state and federal reporting by the State Department of Vocational Education. These are:

Enrollment

Enrollments by course (initial and 2 updates)	3
Adult Voc-Ed (2 per month for 10 months)	2
Useful Home Economics	2
Industrial Arts	2
4048 run for USOE (initial and update)	2
Status runs	4
List of returning students	1
Master Course List	1

Followup

Printout of students and addresses	1
Printout in zipcode order (initial and 3 mailings)	4

Enrollment: Enrollment data of all vocational-technical students in Arizona during 1968-69 included 37,056 high school and 12,958 junior college students. Each student submitted an enrollment card containing name, address, school, class number, teacher name, age, sex, USOE occupational code number and social security number. Class data were collected on all adult vocational education programs, which totaled 26,718 students. Class enrollment data of all Useful Home Economics students, 21,669, and all prevocational or Industrial Arts students, 66,000 were also collected.

The procedure used in individual student data collection is an important result of the Arizona RCU's activities during the past year. A Master Course List is developed by the RCU in July which shows the location of all scheduled vocational-technical programs in the state. This list includes school names, course titles, teachers' names (when available) and approximate numbers of students. It is given to State Supervisors, maintained in the RCU, and keypunched and stored in the Data Processing Center. In the RCU it is used to check the return of enrollment cards; and both mail and telephone reminders are used if cards are not returned on time.

Enrollment cards are mailed to teachers in late August or early September along with teacher handbooks of instructions for their use. A self-addressed, postage-paid envelope is enclosed to return the cards to the RCU by the first of October. The five Community Colleges in Maricopa County do not receive enrollment cards because all enrollment data are stored on magnetic tape in a form compatible with that used by the RCU and vocational-technical student data are submitted directly from the Community College data processing center. This is a procedure the RCU hopes eventually to see developed by all high school and community college districts in the state, eliminating the time-consuming and costly keypunch operation.

The two primary purposes for this enrollment data system are to provide a listing of all vocational-technical students as well as statistics reflecting annual data changes in the structure of vocational-technical education throughout the state, and prepare the detailed reports required by the U.S. Office of Education. Arizona's report this year was accepted by USOE just as it came from the computer without the data having to be transferred onto federal report forms. It was the first case of this kind in the nation.

After enrollment cards are received, each card is edited for minor corrections, i.e., incorrect school number, incorrect occupational code number, etc. If a student neglects to put in his social security number, a dummy number is assigned. When a student later submits his number, the correct number is substituted for the dummy number. All records are maintained in social security number order.

Before keypunching, the cards are checked against a master list prepared from the previous year's enrollment data of students who had indicated they would be continuing in school. Those found on the list merely have their files updated, saving additional keypunching. The others are keypunched and added.

At this point, there are three separate magnetic tape files built by the Data Processing Center: (1) a student detail file which includes the pertinent data for each indivicual student, i.e., name, address, social security number, and occupational code number, (2) a course detail file which includes all the data pertinent to each course being taught in vocational-technical education including number of students enrolled in the course by social security number, and (3) the master course list which was developed before the enrollment began.

About six weeks are required in editing, checking off, batching, keypunching and verifying the initial return of enrollment cards. By the 15th of November a printout of all enrollment data is ready to be submitted to the State Department of Vocational Education.

After inspection by State Supervisors, the printouts are batched by school, and mailed to the teachers for corrections and updating of data. Two copies of each page are sent to the teachers -- one for the teacher to retain, and one to be updated and returned. They are mailed about the first of December with a self-addressed postage-paid envelope and are expected to be returned to the Research Coordinating Unit by the 15th of January.

When all of the updated enrollment printouts are returned they are again edited and checked, batched and sent to Data Processing. By the middle of May a second printout is ready to be submitted to the State Supervisors. After careful checking again, two copies are batched by school and sent to the teachers, this time for an end-of-the-year report. In each teacher's handbook is a list of twenty-five numbers which indicate the student's "status" at the end of the school year. These numbers indicate if the student has completed the program, whether he has job-entry skills, etc. Teachers write the proper status number for each student opposite the student's name and return the updated printouts to the RCU no later than the 15th of June. Again the printouts are edited, checked for accuracy, batched and sent to the Data Processing Center. The magnetic tapes are updated and a final, end-of-the-year printout of all data is ready to be used. A flow chart of the entire system is shown in Appendix G, pages 43-47.

During the year as printouts are run several statistical tabulations are prepared for use by the State Department of Vocational Education and the RCU. These consist of enrollment totals by school, county, sex, etc. and are extremely useful to State Supervisors to indicate problem areas such as classes being taught with less than ten students enrolled. They are also useful to County Coordinators, the trouble-shooters for the State Department of Vocational Education.

After all data have been collected, keypunched, verified and stored on reels of magnetic tape it is possible for the RCU to provide various kinds of information to vocational educators, and particularly to the State Department of Vocational Education. During the past year, each State Supervisor and County Coordinator was given a 109 page "data book" containing such information as: enrollments by service, county and school; enrollment by course number in high schools and junior colleges within services;

enrollment comparisons between regular enrollments and vocational enrollments by school district and county; high schools without any vocational education programs; and total enrollments by service. This year a similar 119 page publication was distributed containing total enrollment both duplicated and unduplicated, and completions and compared with the previous year; enrollment summary by service; course enrollments by service; secondary enrollments by county and school; junior college enrollments; special needs programs by school; secondary enrollment summary statewide and by county; status "3" (not graduating but has completed this class and plans to enroll in further course work in the same vocational area next year) statistics; high school data range by student and school; multiple high school districts and enrollments; high schools without vocational education, and classes with enrollments of ten students or less.

Followup: At the end of the school year those students completing a vocational-technical program in Arizona's high schools and junior colleges with job entry skills are surveyed. Beginning next year all students no longer in the program will be included. This survey is conducted by mail using a questionnaire which looks like two IBM cards attached at one end by a perforated line. One of the cards contains the student's name and address and bulk mailing postage permit on one side, and instructions for filling out the questionnaire on the reverse side. The second card contains a questionnaire with seven questions on one side and return postage and the RCU mailing address on the other side. All the student must do is tear the cards apart, check the seven response boxes of the questionnaire, and drop it in the mail.

This two-part card is printed in a continuous perforated roll on which names and addresses of students to be followed up are printed by the computer in zip code order. As the names and addresses are being printed the computer is also punching a set of numbers in the return card identifying the student's enrollment file.

This year 5,297 high school and 1,228 junior college students are being surveyed. Information is being gathered on: (a) how many former students are now employed full-time -- in the occupation for which they were trained -- in an occupation related to their training -- or in an occupation unrelated to their training? (b) how many former students are in the armed forces? (c) how many former students have continued in school part-time or full-time and the type of school? (d) how many former students are employed part-time? (e) how many are employed part-time and going to school, either part-time or full-time? (f) how many students are unemployed and looking for a job? and (g) how many students are unemployed and not looking for a job?

CONCLUSIONS AND RECOMMENDATIONS

The RCU in Vocational-Technical Education

The RCU was established as an experimental program to fill certain needs for vocational research development, coordination, and dissemination. In Arizona these areas of activity have been undertaken to meet the particular needs of the State Department of Vocational Education, vocational educators, researchers and business and industry. Trial and error methods have largely been employed based however upon the exacting requirements of reliability and validity in the end results reflecting a firm commitment to the principles and professional standards of scientific research.

The RCU now provides four major services: research development including the identification of research needs; research coordination and dissemination; educational data collection, storage and retrieval; and exemplary program development. Each of these areas of activity is the responsibility of a division in the RCU staff structure. The staff and the services they perform are available to the State Department, to educational institutions, and to vocational educators and researchers throughout the state and are being rapidly increased to meet a constant demand.

The role of the RCU is best described as the cutting edge in a systems approach to educational change. It assembles the results of research and experimentation from all of the states; it channels these results into the hands of educators who need them and who are in a position to use them; it identifies the problems of vocational educators, school administrators, and state officials in constantly updating vocational education to meet the needs of students and employers; it plans and develops research within the state wherever necessary to meet those needs; it collects and processes a growing quantity and variety of educational data for research, analysis, and program development; and beginning this year it provides assistance in developing innovative programs in the schools based on research which carry the change process one more step toward implementation.

Recommendations

In a sense recommendations are unnecessary at the end of the direct federal grant period of RCU operations since those with direct application possibilities have already been incorporated in the State Plan. It seems advisable nevertheless to list several principles which the experience of the past four years would indicate are useful as guidelines for the future.

1. The Arizona RCU has probably reached its optimum level of staffing and responsibility with the addition of a separate Head of the Division of Research Development. It is even possible that some of its present responsibilities could be transferred to operating agencies or institutions when they become completely routine or fully developed.

2. The RCU is a university-based organization working closely with the State Department of Vocational Education has advantages over any other kind of arrangement. The professional resources, staffing, and performance standards of the University thus become important assets of the State Department in its leadership role of planning and development.

3. The RCU should remain a service organization in the fullest sense of the word, accepting operational responsibilities only as they are necessary in research and development. Even the actual conduct of research should be left to others as far as possible. Probably there will always be some research functions which only the RCU can perform economically and efficiently, but these should be kept to a minimum.

4. All of the resources available in all three universities should be utilized to the greatest extent possible in a continuous program of vocational education research.

5. Junior colleges, high schools, even elementary schools, business and industry, the State Department of Vocational Education, and the State Employment Service should be directly involved in the vocational research of the universities and in projects of their own. The bridge from research to implementation must be built into the research itself, not constructed afterwards.

6. The ERIC system should be adapted to direct-access search and retrieval, and the RCU should have its entire library in ERIC instead of having to maintain a separate facility. Regional computer centers with complete ERIC files, and remote terminals tied into these centers in each RCU, together with a fully operational automatic search and retrieval system through the remote terminals is strongly recommended.

7. Finally, the weakest part of the whole vocational research program is the lack of an effective and efficient system of review. Results are buried in a growing volume of reports which no one has time to read. A means of singling out those particular reports which contribute significantly to the state of knowledge is becoming more urgent every day. This should be done on a national scale using national, state and local input.

APPENDIX A

RESEARCH ACTIVITIES SUPPORTED
FROM DISCRETIONARY AWARD FUND

Project	Title	Discretionary Award Funds
RCU-67-2	Learning A Living	569.10
ASU-67-3	Dennis Wood Study	249.57
CC-68-1	Cochise Project	950.00
NAU-68-5	NAU Followup	3,527.11
NAU-68-10	Survey of Flagstaff Women	769.19
ASU-68-13	Televised Course in Careers	900.00
NAU-68-17	17 Year Pre-vocational Education	1,560.76
ASU-68-26	Industrial Internship	1,700.00
UA-68-28	Internal Combustion Course - Agricultural	670.00
RCU-68-33	State Department Research Conference	1,010.64
RCU-68-34	Teacher-Educators Research Conference	908.70
PUBS-68-35	No-Show Survey	178.21
ASU-68-42	Counselor Training Program	300.00
RCU-68-49	Employer Evaluation	227.84
UA-68-50	Cost Benefits Study	1,000.40
UA-68-51	Machinery and Irrigation	600.00
RCU-68-55	Industrial Arts - Home Economics Useful Enrollment	100.00
RCU-68-57	Library Survey	150.00
RCU-68-58	Engineering & Technology Update Survey	297.14
RCU-68-62	Research Reviews	600.00
RCU-68-63	Newsletter	396.24
ASU-68-64	Counseling Committee	600.00
UA-69-1	Health Manpower	500.00
RCU-69-3	Teacher Data Bank	124.43
FWBS-69-8	Comprehensive High School	500.00
GLCC-69-10	Language Skills Evaluation	76.96
ASU-69-12	Office Education Tasks	758.26
NAU-69-18	Comphrensive Teacher Education	800.00
RCU-69-16	State Plan	120.00
NAU-69-5	Prison Vocational Education Evaluation	20.40
UA-68-52	Vocational Comp. in Agriculture	550.00
	TOTAL	$20,714.95

APPENDIX B

LIBRARY CODES

Catalogue #	
RC 100 000	ERIC Series
RC 100 100	Ohio State Series
RC 100 200	Wisconsin Center Series
RC 100 300	RCU Series
RC 100 400	Dissertations and Theses
RC 100 500	Miscellaneous Series
RC 100 600	Regional Projects & Abstracts
RC 100 700	National Projects & Abstracts
RC 110 100	Directories
RC 110 200	Research Reference Works
RC 110 300	Occupational Reference Works
RC 110 400	Economic Data
RC 110 500	Miscellaneous Data
RC 200 000	Arizona Publications (except periodicals)
RC 300 000	U.S. Government Publications (except periodicals)
RC 400 000	Out of State University Publications (except periodicals)
RC 500 000	Out of State, Private & Public Publications (except periodicals)
RC 600 000	Periodicals, regular bulletins & newsletters
RC 700 000	Career Information

Content Coding

Level of Education	
E001	All
E002	Elementary
E003	Junior High
E004	High School
E005	Junior College
E006	College or University
E007	Graduate
E008	Adult
E009	Apprenticeship

Agriculture	
0600	All Agriculture
0601	Agricultural Production
0602	Agricultural Supplies
0603	Agricultural Mechanics
0604	Agricultural Products (Processing)
0605	Ornamental Horticulture
0606	Agricultural Resources
0607	Forestry
0699	Other Agriculture

LIBRARY CODES

Distributive Education

0700	All Distributive Education
0701	Advertising Services
0702	Apparel & Accessories
0703	Automotive
0704	Finance & Credit
0705	Floristry
0706	Food Distribution
0707	Food Service
0708	General Merchandise
0709	Hardward, Bldg. Materials, Farm & Garden Supplies & Equipment
0710	Home Furnishing
0711	Hotel & Lodging
0712	Industrial Marketing
0713	Insurance
0714	International Trade
0715	Personal Services
0716	Petroleum
0717	Real Estate
0718	Recreation & Tourism
0719	Transportation
0720	Retail Trade, other
0731	Wholesale Trade, other
0799	NEC

Health

0800	All Health
0801	Dental Technology
0802	Medical Laboratory Technology
0803	Nursing
0804	Rehabilitation
0805	Radiology
0806	Opthamology
0807	Environmental Health
0808	Mental Health Technology
0809	Miscellaneous

Home Economics

0900	All Homemaking
0910	Consumer Homemaking
0911	Comprehensive Homemaking or Home Economics
0912	Child Development
0913	Clothing and Textiles
0914	Consumer Education
0915	Family Health
0916	Family Relations
0917	Foods and Nutrition
0918	Home Management
0919	Housing and Home Furnishings
0999	Other Homemaking
0920	All Gainful Home Economics
0921	Care and Guidance of Children
0922	Clothing Management, Production & Services

Office Education

1000	All Office Education
1001	Accounting and Computing
1002	Business Data Processing Systems
1003	Filing, Office Machines, and General Office Clerical
1004	Information Communication
1005	Materials Support, Transporting, Storing, and Recording
1006	Personnel, Training, and Related
1007	Stenographic, Secretarial, and Related
1008	Supervisory and Administrative Management
1009	Typing and Related
1099	Other, NEC

LIBRARY CODES

Home Economics (cont'd)

0923	Food Management, Production, and Services
0924	Home Furnishings, Equipment and Services
0925	Institutional and Home Management & Supporting Services
0929	Other Occupational Preparation

Trade and Industry

1200	All Trade & Industry
1201	Air Conditioning
1202	Appliance Repair
1203	Automotive Industries
1204	Aviation Occupations
1205	Blueprint Reading
1206	Business Machine Maintenance
1207	Commercial Art Occupations
1208	Commercial Fishery Occupations
1209	Commercial Photography Occupations
1210	Construction & Maintenance Trades
1211	Custodial Services
1212	Diesel Mechanic
1213	Drafting Occupations
1214	Electrical Occupations
1215	Electronics Occupations
1216	Fabric Maintenance Services
1217	Foremanship, Supervision & Management Development
1218	General Continuation
1219	Graphic Arts Occupations
1220	Industrial Atomic Energy Occupations
1221	Instruments Maintenance & Repair Occupations
1222	Maritime Occupations
1223	Metalworking Occupations
1224	Metallurgy Occupations
1225	Nucleonic Occupations
1226	Personal Services
1227	Plastics Occupations
1228	Public Service

Technical Education

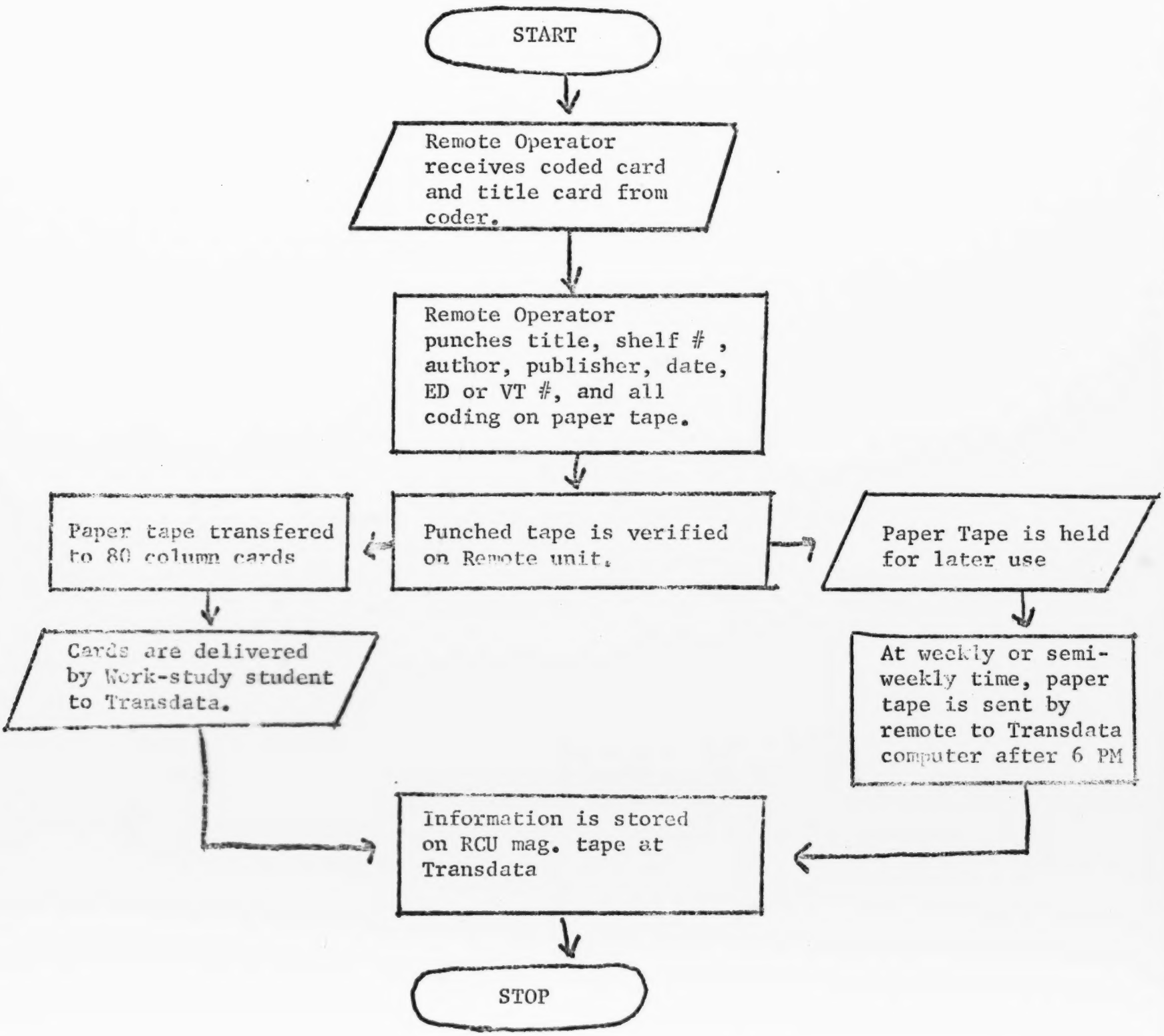
1100	All Technical Education
1101	Engineering Related Technology
1102	Agricultural Related Technology
1103	Health Related Technology
1104	Office Related Technology
1105	Home Economics Related Technology
1106	Miscellaneous Technology

Indexing (Subject Matter)

I 201	Administration
I 202	Educational Policy
I 203	12 Month School
I 204	Finance
I 205	Cost Benefit Analysis
I 206	Disadvantaged
I 207	Handicapped
I 208	Guidance & Counseling
I 209	Computerized Guidance
I 210	Program Development
I 211	Program Analysis & Evaluation
I 212	Curriculum R & D
I 213	Cluster or Core Curriculums
I 214	Exemplary R & D
I 215	Computerized Instruction
I 216	Programmed Instruction
I 217	Instructional Methods
I 218	Facilities
I 219	Vocational Teacher Education
I 220	Equipment
I 221	Teaching Staff & Selection
I 222	Flexible & Modular Scheduling
I 223	Voc-Tech Legislation
I 224	Dissemination & Retrieval
I 225	Dropouts
I 226	Job Cluster Concept
I 227	Job Placement
I 228	Occupational Information
I 229	Manpower Needs
I 230	Work Study

APPENDIX D

FLOWCHART FOR REMOTE IMPUT PROCEDURES


START
Remote Operator receives coded card and title card from coder.
Remote Operator punches title, shelf # , author, publisher, date, ED or VT #, and all coding on paper tape.
Paper tape transfered to 80 column cards
Punched tape is verified on Remote unit.
Paper Tape is held for later use
Cards are delivered by Work-study student to Transdata.
At weekly or semi-weekly time, paper tape is sent by remote to Transdata computer after 6 PM
Information is stored on RCU mag. tape at Transdata
STOP

APPENDIX B (CONT'D)

LIBRARY CODES

Trade and Industry (cont'd)

1229	Quantity Food Occupations
1230	Refrigeration
1231	Small Engine Repair
1232	Stationary Energy Sources Operator
1233	Textile Production & Fabrication
1234	Shoe Manufacturing/Repair
1235	Upholstering
1236	Woodworking Occupations
1239	Other Trades & Industry Occupations
1801	Administration
1901	All Occupations

Indexing (cont'd)

I 231	On-Job Training
I 232	Occupational Psychology
I 233	Labor Economics
I 234	Reference Materials
I 235	Data Collection
I 236	Certification
I 237	Indian Education
I 238	Practicum
I 239	Taxonomy
I 240	Comprehensive High School
I 241	Area Vocational School
I 242	Innercity School
I 243	Suburban School
I 244	Small Rural School
I 245	Basic Education
I 246	MDTA
I 247	Skill Center

Classification

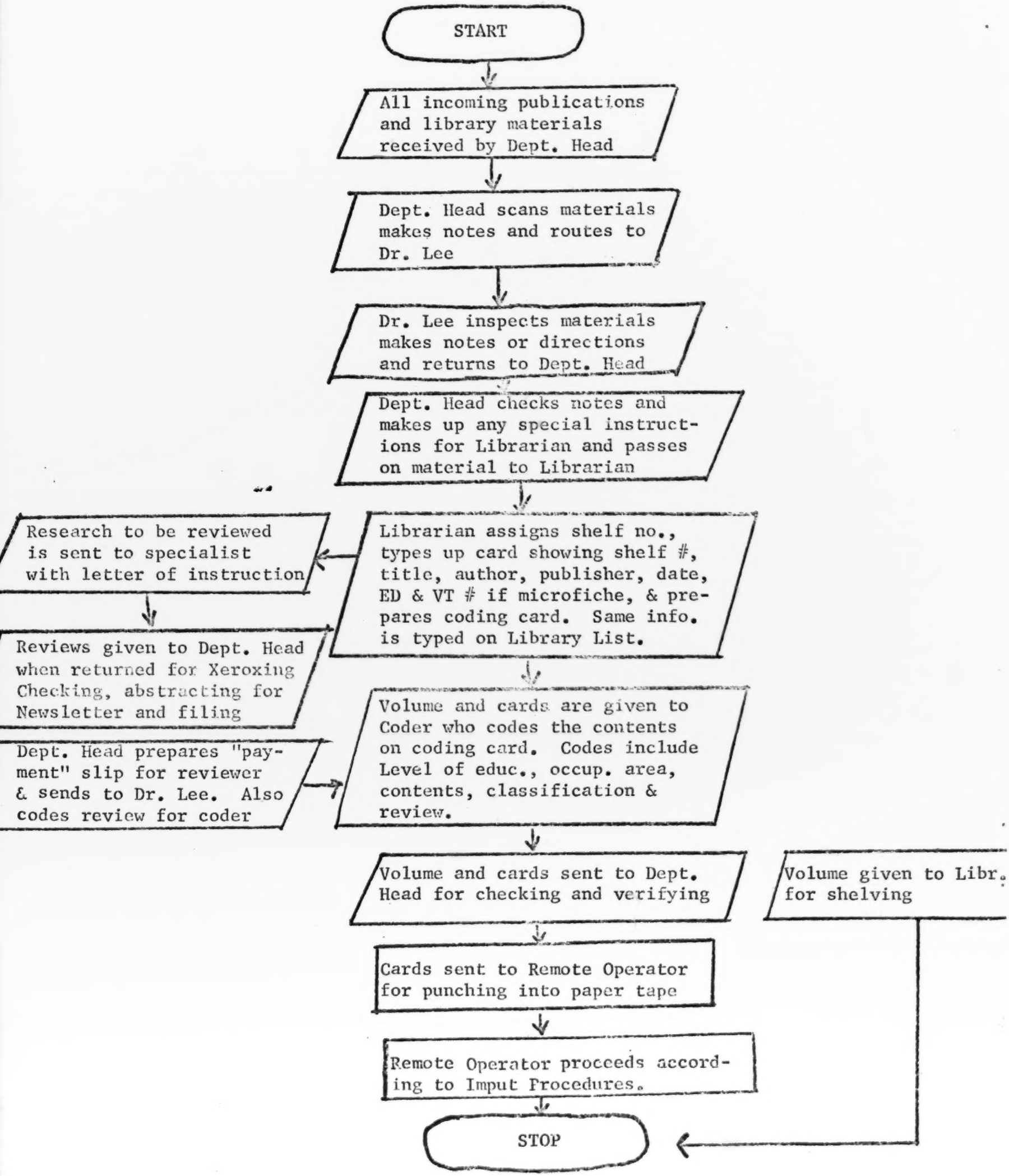
C 501	Research Reports
C 502	Workshop Reports
C 503	Conference Reports
C 504	Demonstration or Pilot Projects
C 505	Source Material & Data
C 506	Commercial Voc-Tech Publications
C 507	Non-commercial Voc-Tech Publications
C 508	Monographs
C 509	Proposals
C 510	Institutional Reports
C 511	Exemplary Programs
C 512	Curriculum Materials

Reviewed

R 101	Instate - favorable
R 102	Instate - neutral
R 103	Instate - unfavorable
R 104	National - favorable
R 105	National - neutral
R 106	National - unfavorable

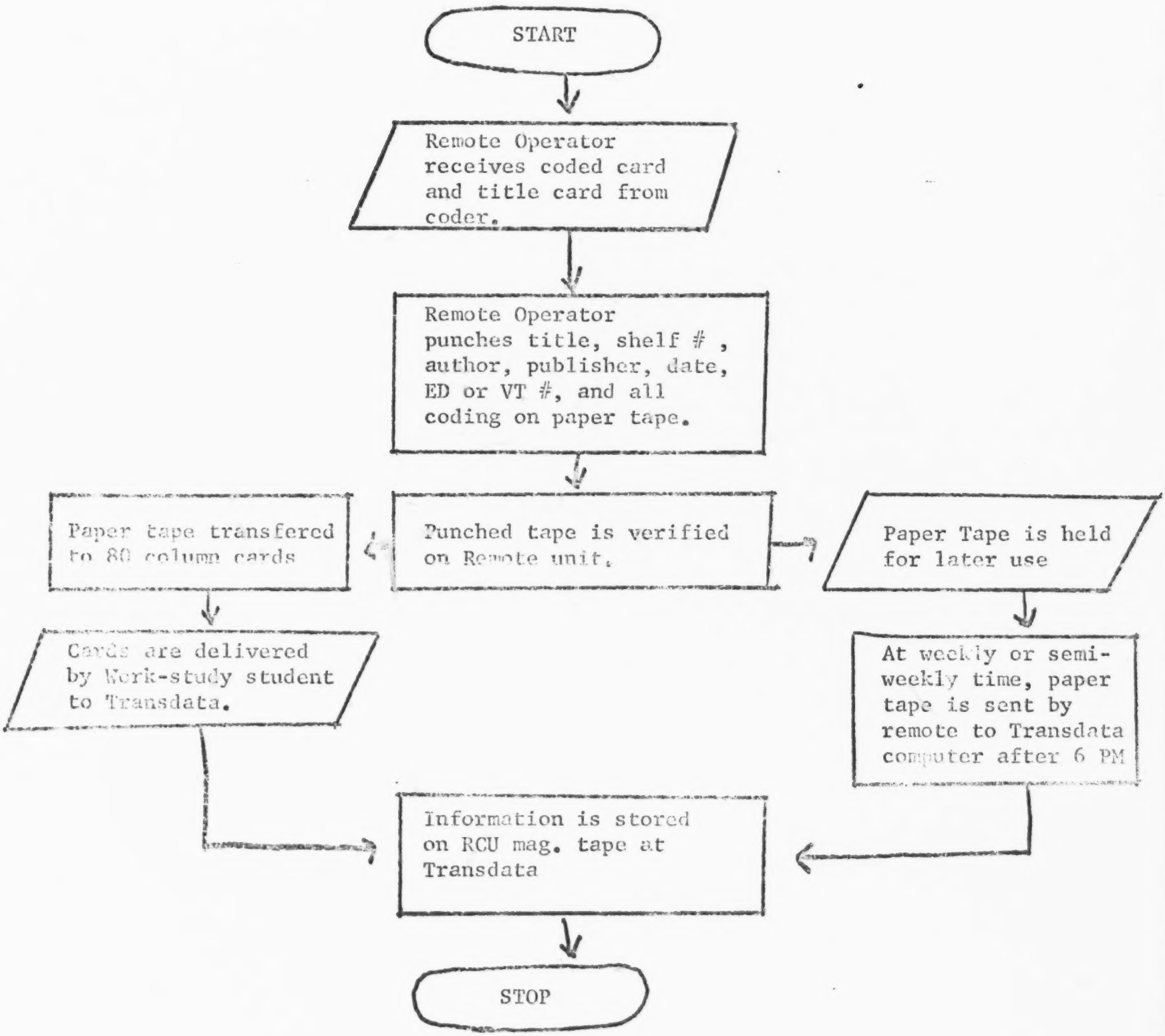
APPENDIX C

FLOWCHART OF PROCEDURES FOR RECEIVING OF LIBRARY MATERIALS


START
All incoming publications and library materials received by Dept. Head
Dept. Head scans materials makes notes and routes to Dr. Lee
Dr. Lee inspects materials makes notes or directions and returns to Dept. Head
Dept. Head checks notes and makes up any special instructions for Librarian and passes on material to Librarian
Librarian assigns shelf no., types up card showing shelf #, title, author, publisher, date, ED & VT # if microfiche, & prepares coding card. Same info. is typed on Library List.
Research to be reviewed is sent to specialist with letter of instruction
Reviews given to Dept. Head when returned for Xeroxing Checking, abstracting for Newsletter and filing
Dept. Head prepares "payment" slip for reviewer & sends to Dr. Lee. Also codes review for coder
Volume and cards are given to Coder who codes the contents on coding card. Codes include Level of educ., occup. area, contents, classification & review.
Volume and cards sent to Dept. Head for checking and verifying
Volume given to Libr. for shelving
Cards sent to Remote Operator for punching into paper tape
Remote Operator proceeds according to Imput Procedures.
STOP

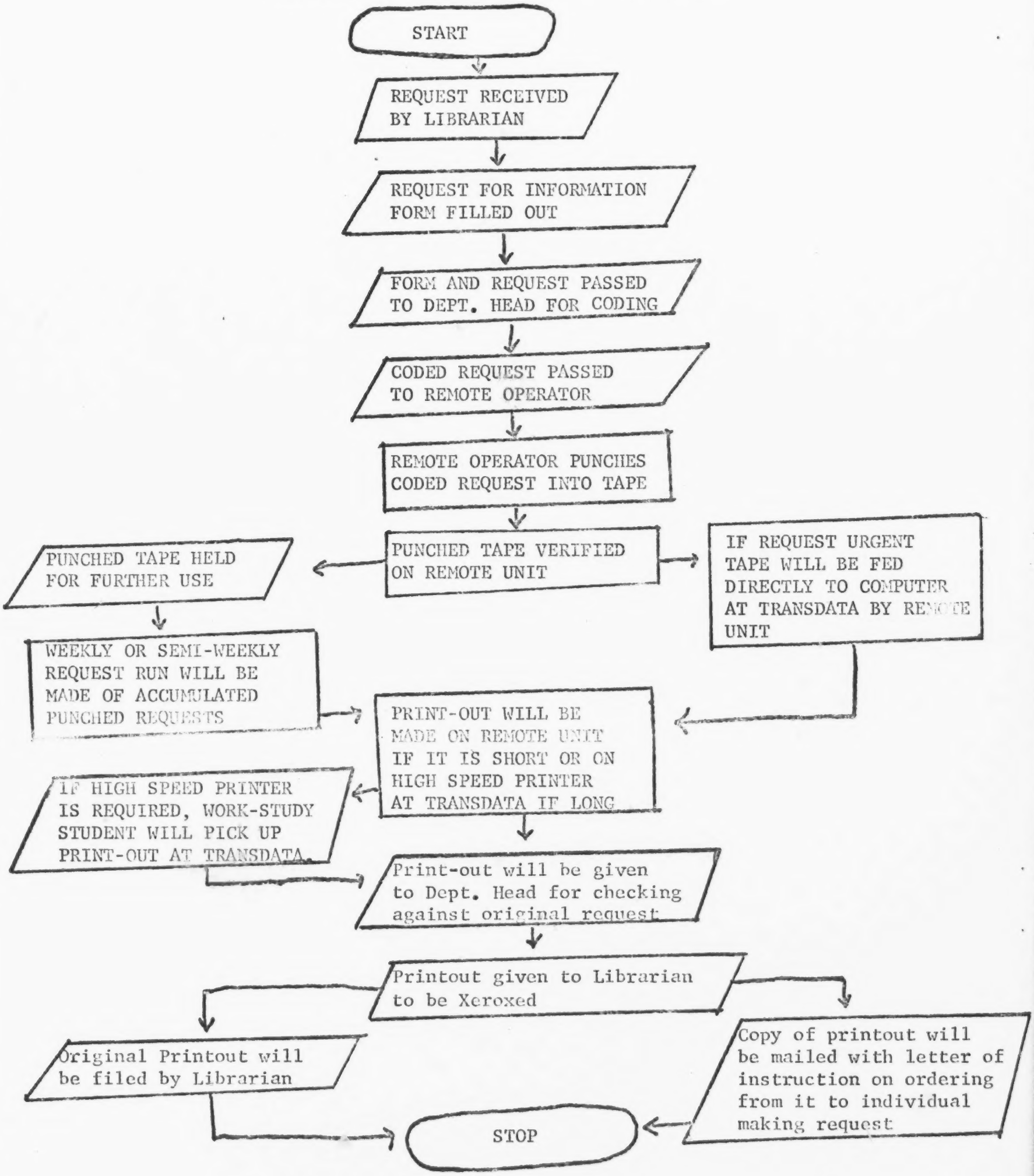
APPENDIX D

FLOWCHART FOR REMOTE IMPUT PROCEDURES


START
Remote Operator receives coded card and title card from coder.
Remote Operator punches title, shelf # , author, publisher, date, ED or VT #, and all coding on paper tape.
Punched tape is verified on Remote unit.
Paper tape transfered to 80 column cards
Paper Tape is held for later use
Cards are delivered by Work-study student to Transdata.
At weekly or semi-weekly time, paper tape is sent by remote to Transdata computer after 6 PM
Information is stored on RCU mag. tape at Transdata
STOP

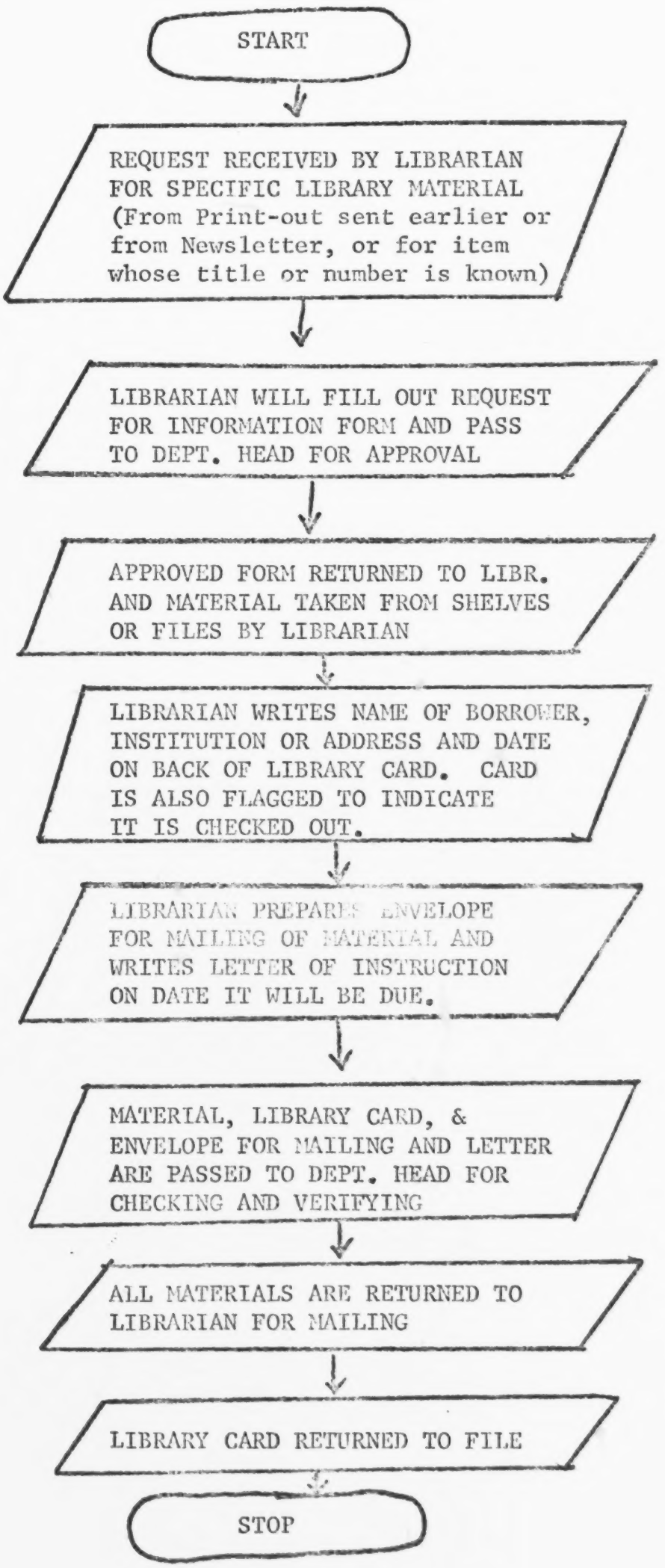
APPENDIX E

FLOWCHART FOR REMOTE RETRIEVAL PROCEDURES


START
REQUEST RECEIVED BY LIBRARIAN
REQUEST FOR INFORMATION FORM FILLED OUT
FORM AND REQUEST PASSED TO DEPT. HEAD FOR CODING
CODED REQUEST PASSED TO REMOTE OPERATOR
REMOTE OPERATOR PUNCHES CODED REQUEST INTO TAPE
PUNCHED TAPE VERIFIED ON REMOTE UNIT
PUNCHED TAPE HELD FOR FURTHER USE
IF REQUEST URGENT TAPE WILL BE FED DIRECTLY TO COMPUTER AT TRANSDATA BY REMOTE UNIT
WEEKLY OR SEMI-WEEKLY REQUEST RUN WILL BE MADE OF ACCUMULATED PUNCHED REQUESTS
PRINT-OUT WILL BE MADE ON REMOTE UNIT IF IT IS SHORT OR ON HIGH SPEED PRINTER AT TRANSDATA IF LONG
IF HIGH SPEED PRINTER IS REQUIRED, WORK-STUDY STUDENT WILL PICK UP PRINT-OUT AT TRANSDATA.
Print-out will be given to Dept. Head for checking against original request
Printout given to Librarian to be Xeroxed
Original Printout will be filed by Librarian
Copy of printout will be mailed with letter of instruction on ordering from it to individual making request
STOP

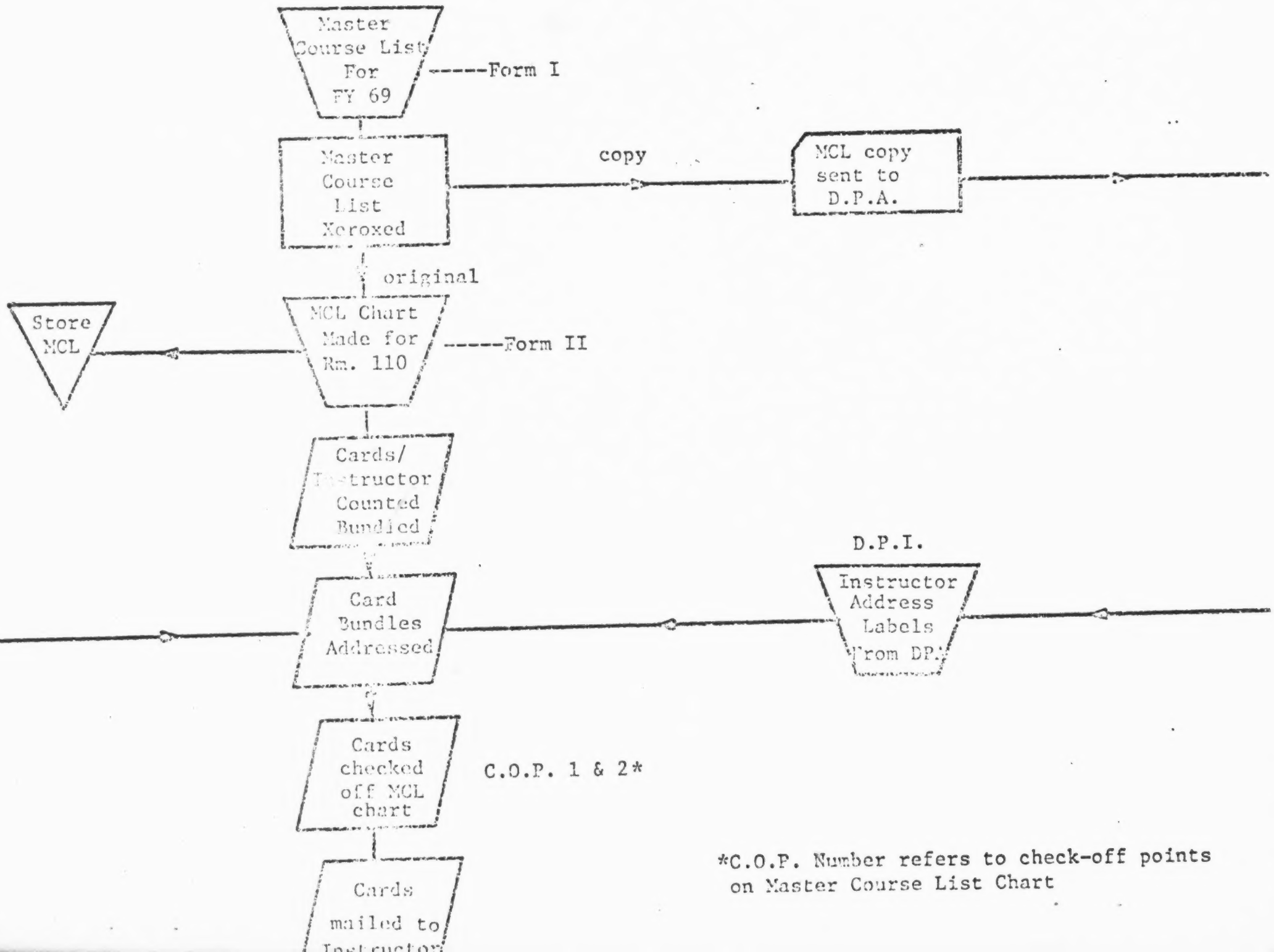
APPENDIX F

FLOWCHART OF PROCEDURES FOR SUPPLYING SPECIFIC LIBRARY MATERIALS ON REQUEST


START
REQUEST RECEIVED BY LIBRARIAN FOR SPECIFIC LIBRARY MATERIAL (From Print-out sent earlier or from Newsletter, or for item whose title or number is known)
LIBRARIAN WILL FILL OUT REQUEST FOR INFORMATION FORM AND PASS TO DEPT. HEAD FOR APPROVAL
APPROVED FORM RETURNED TO LIBR. AND MATERIAL TAKEN FROM SHELVES OR FILES BY LIBRARIAN
LIBRARIAN WRITES NAME OF BORROWER, INSTITUTION OR ADDRESS AND DATE ON BACK OF LIBRARY CARD. CARD IS ALSO FLAGGED TO INDICATE IT IS CHECKED OUT.
LIBRARIAN PREPARES ENVELOPE FOR MAILING OF MATERIAL AND WRITES LETTER OF INSTRUCTION ON DATE IT WILL BE DUE.
MATERIAL, LIBRARY CARD, & ENVELOPE FOR MAILING AND LETTER ARE PASSED TO DEPT. HEAD FOR CHECKING AND VERIFYING
ALL MATERIALS ARE RETURNED TO LIBRARIAN FOR MAILING
LIBRARY CARD RETURNED TO FILE
STOP

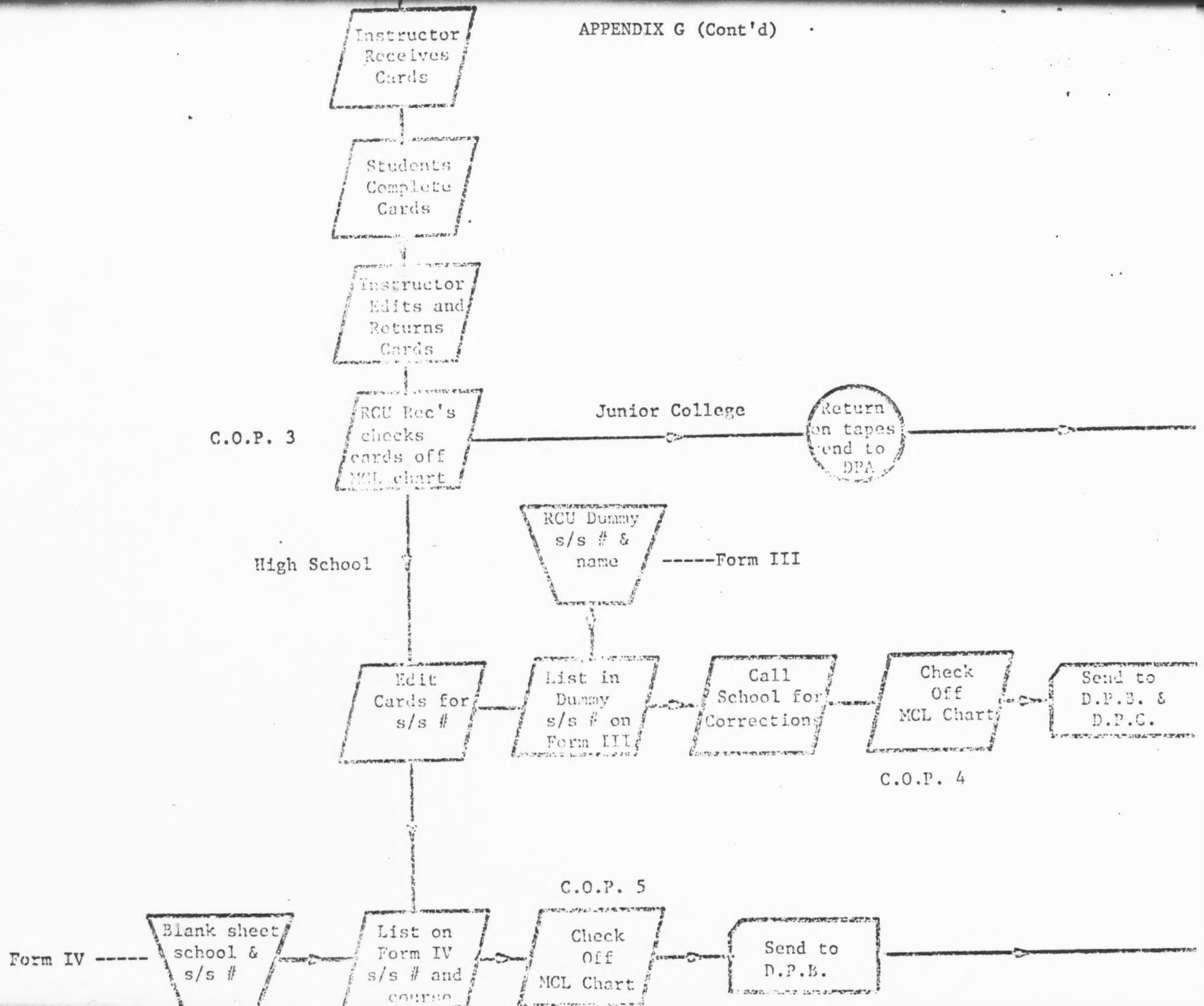
APPENDIX G

VOCATIONAL EDUCATION ENROLLMENT FLOWCHART

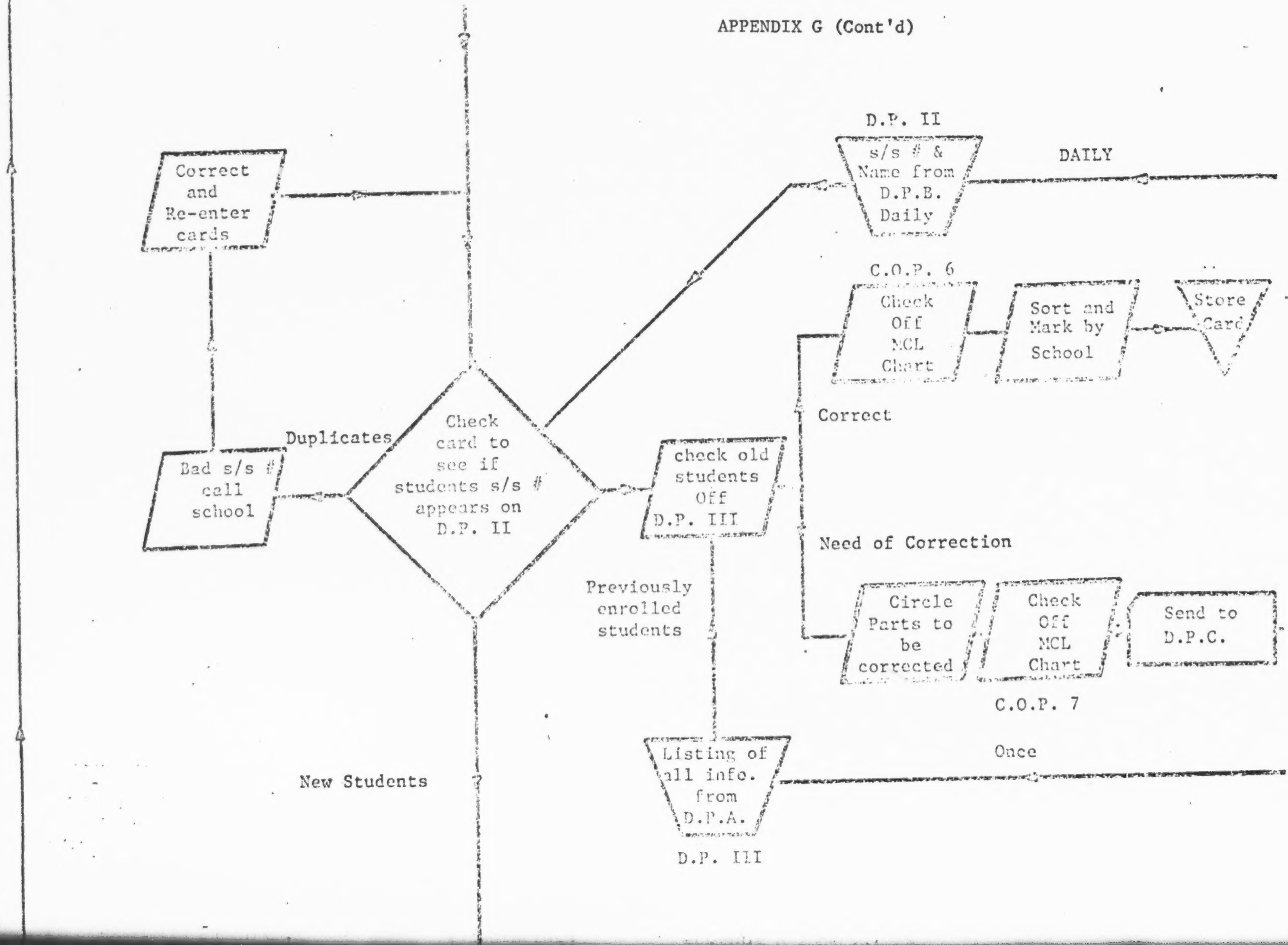


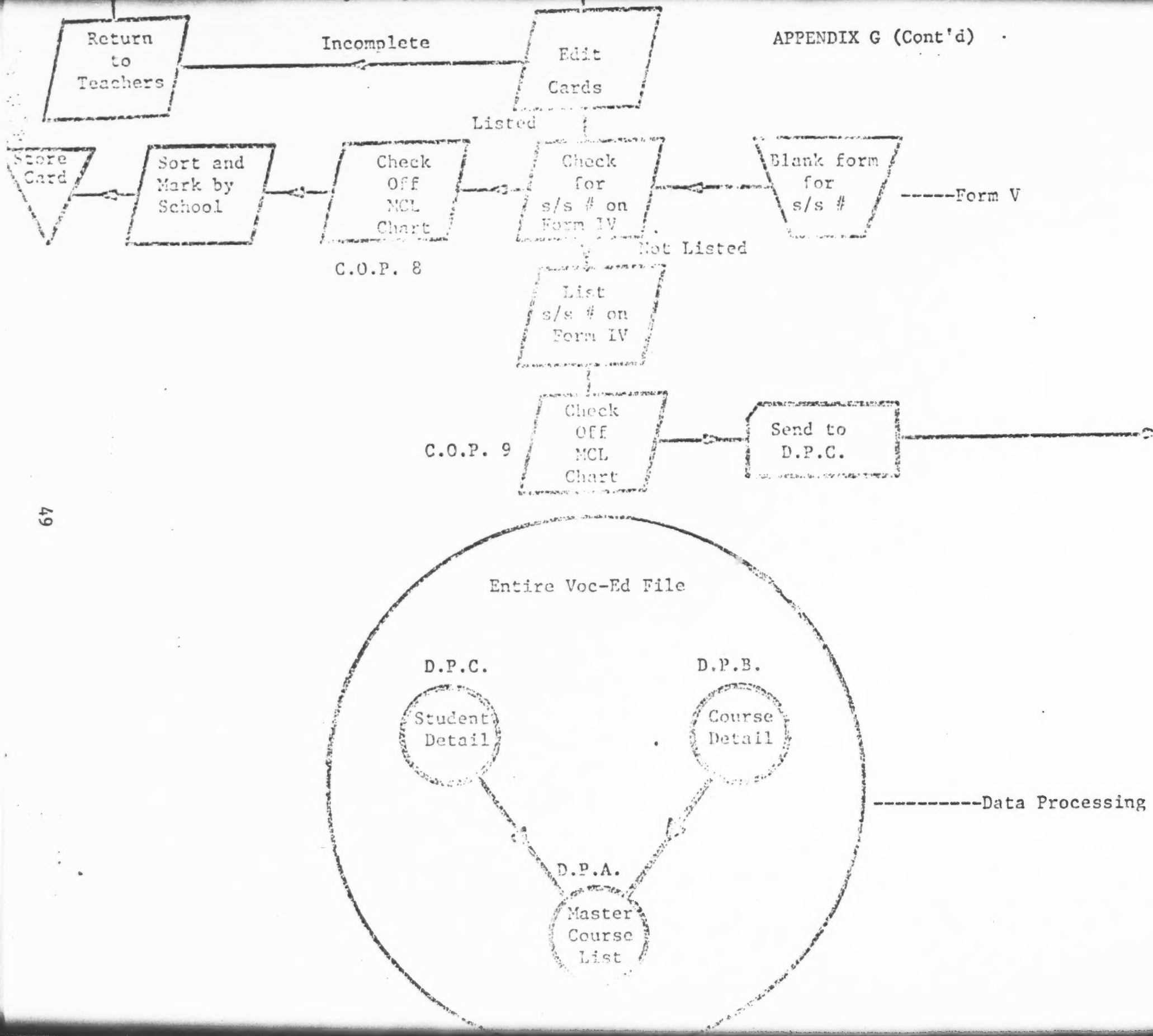
*C.O.P. Number refers to check-off points on Master Course List Chart

APPENDIX G (Cont'd)


Instructor Receives Cards
Students Complete Cards
Instructor Edits and Returns Cards
RCU Rec's checks cards off MCL chart
C.O.P. 3
Junior College
Return on tapes send to DPA
High School
RCU Dummy s/s # & name
-----Form III
Edit Cards for s/s #
List in Dummy s/s # on Form III
Call School for Correction
Check Off MCL Chart
Send to D.P.B. & D.P.C.
C.O.P. 4
C.O.P. 5
Form IV -----
Blank sheet school & s/s #
List on Form IV s/s # and course
Check Off MCL Chart
Send to D.P.B.

APPENDIX G (Cont'd)




Return to Teachers
Incomplete
Edit Cards
Listed
Store Card
Sort and Mark by School
Check Off MCL Chart
C.O.P. 8
Check for s/s # on Form IV
Blank form for s/s #
-----Form V
Not Listed
List s/s # on Form IV
C.O.P. 9
Check Off MCL Chart
Send to D.P.C.
Entire Voc-Ed File
D.P.C.
Student Detail
D.P.B.
Course Detail
D.P.A.
Master Course List
----------Data Processing

APPENDIX H

UPDATE VOCATIONAL EDUCATION ENROLLMENT FLOWCHART